REMARKS/ARGUMENTS

There are no amendments to the specification or drawings herein.

In the Claims, Claims 1-30 are pending. Claims 15-20 are allowed. However, Claims 1-13, 21-28 and 30 are rejected and Claims 14 and 29 are objected to. Claim 13 has been canceled herein, without prejudice. Reconsideration is respectfully requested.

Claim 1 is amended hereinabove. Support for the amendment to Claim 1 is found at least in Claims 2 and 3, as originally filed. Claims 2, 3 and 4 are amended to better correspond to amended Claim 1. No new matter is added. Consideration and entry of the amendments to Claims 1-4 are respectfully requested.

Claim 21 is amended hereinabove. Support for the amendment to Claim 21 is found at least in originally filed Claims 22, 23 and 24, as well as on Page 19, lines 27-28, of Applicant's specification, as originally filed. Claim 22 is amended to better correspond to amended Claim 21. No new matter is added. Consideration and entry of the amendments to Claims 21-22 are respectfully requested.

Claim 26 is amended to change "edge detection" to "edge density determination". Support for the amendment of Claim 26 is found at least in Claims 27, as originally filed. Claim 27 is amended to better correspond to amended Claim 26. No new matter is added. Consideration and entry of the amendments to Claims 26 and 27 are respectfully requested.

The examiner rejected Claims 1, 2, 3, 10, 11, 12, 21, 23, 24, 26, 27 and 28 under 35 U.S.C. 102(b) as being anticipated by Acharya et al., U.S. Patent No. 6,151,415 (hereinafter 'Acharya et al.'). Applicant respectfully traverses the rejection on the grounds that a *prima facie* case of anticipation with respect Claims 2, 3, 10-12, 23, 24, 27 and 28 has not been established. In particular, Applicant submits that the examiner has failed to show that Acharya et al. disclose, explicitly or implicitly, "each element of the claim under consideration" (*W.L. Gore & Associates v. Garlock*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983)) and/or that Acharya et al. disclose the claimed elements "arranged as in the claim" (*Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984)) as required by the Federal Circuit for *prima facie* anticipation under 35 U.S.C. 102.

For example, contrary to that contended by the examiner, Acharya et al. fail to disclose computing or using a "density of edges" or "edge density" in an image of an object to "determine an optimum focus position". Similarly, Acharya et al. do not disclose "determining the optimum focus position for the imaging system" where the optimum focus position is "associated with the image having a greatest computed edge density". In fact, Acharya et al. are silent on edge density and the use thereof for automatic focusing, contrary to the examiner's contention.

Instead, at Col. 3, lines 24-30 and lines 52-58, which were relied upon by the examiner, Acharya et al. disclose an auto-focusing algorithm that employs a computed "sharpness parameter" to "measure a prominence of edges" within a discrete wavelet transform (DWT) decomposition of an image (Acharya et al., Col. 3, lines 24-26). According to Acharya et al., an optimal focus position for a given scene is determined by applying the DWT to "a series of captured images (each captured at a different focus length), computing at each captured image its sharpness parameter" such that the focus length or position having "the highest sharpness parameter is the most optimal focus position" (Acharya et al., Col. 3, lines 54-58).

The sharpness parameter, as defined by Acharya et al., measures how prominent or conspicuous the edges are in one or more sub-bands of the DWT of the image. In particular, the "sharpness parameter S for a given sub-band is the average of the absolute values of the DWT coefficient within that sub-band that fall between T_L and T_H, inclusive", where T_L and T_H are a lower threshold and upper threshold, respectively (Acharya et al., Col. 4, lines 6-9). The sharpness parameter for an entire image at a particular focus position d is further defined as an average of the sub-band sharpness parameters, according to Acharya et al.

As such, the sharpness parameter S disclosed by Acharya et al. measures an average intensity (i.e., absolute value of the DWT coefficients) of all of the edges within the image, as detected by the DWT decomposition and constrained by the upper and lower thresholds. Specifically, the sharpness parameter quantifies an average "change in grayscale intensity between one pixel and its neighbor(s)" within the image (Acharya et al., Col. 3, lines 27-28). Essentially, the sharpness parameter S

determines how sharp or abrupt an average detected edge is within the image. The sharpness parameter is entirely unrelated to a number of edges detected in the image.

In contrast, Applicant discloses a ***density*** of edges detected in an image (i.e., edge density) wherein the density of edges is a measure of or directly related to the number of edges. For example, the edge density may be computed by edge detecting and counting a number of edges in an image and "once the number of edges, or equivalently, the number of pixels containing edges is determined using edge-detection, edge density may be computed by dividing the number of edges (e.g., pixels containing edges) by a total number of pixels in the image (Applicant's specification, Page 10, line 30, through Page 11, line 2). Thus, one skilled in the art would readily recognize that the sharpness parameter of Acharya et al. related as it is to average ***edge intensity*** is clearly different from ***edge density***, as claimed by Applicant.

It appears that the examiner realized that Acharya et al. do not disclose edge density or using edge density. Specifically regarding Claim 2, the examiner contended, "Acharya discloses of [*sic*] computing ***sharpness*** of each image captured by measuring edges of each image and selects the focus position used to capture that image that has the highest sharpness parameter as the most optimal focus position" (***emphasis*** added). The examiner did not and could not point to anywhere in Acharya et al. of a disclosure of using density of edges and instead merely relied on a disclosure of using sharpness by Acharya et al. Since image 'sharpness' is clearly not 'edge density', as viewed by one skilled in the art, it appears that the examiner acknowledged the lack of a disclosure by Acharya et al. regarding edge density. To establish *prima facie* anticipation the examiner ***must*** demonstrate that there is no difference "between the claimed invention and the reference disclosure, ***as viewed by a person of ordinary skill*** in the field of the invention" (***emphasis*** added) *Scripps Clinic & Research Found. v. Genentech Inc.*, 927 F.2d 1565, 18 USPQ 2d 1001, 1010 (Fed. Cir. 1991).

As such, Acharya et al. clearly do not and cannot disclose each element recited in rejected Claims 2, 10-12, 23 and 27, as originally filed. Therefore, the rejection of Claims 2, 10-12, 23 and 27 should be withdrawn. Furthermore, Applicant has added

the edge density feature to Claims 1, 21 and 26, as amended herein. Since Acharya et al. at least do not and cannot disclose 'edge density', as recited in amended Claims 1, 21 and 26, the rejection of Claims 1, 21 and 26 should be withdrawn also.

Regarding Claims 3, 24 and 28, Acharya et al. fails to disclose that recited in the claims, as originally filed, contrary to that contended by the examiner. In particular, Acharya et al. fail to disclose 'image comparison' or generally "applying a difference between" focus positions for an image of a typical object to a focus position of an image of the object being imaged to determine an optimum focus position, wherein one of the typical object image focus positions closely matches the object image, as claimed by Applicant.

Contrary to the examiner's contentions, Acharya et al. disclose comparing "two focus position sharpness parameters", as pointed out by the examiner in rejecting Claim 3. Comparing sharpness parameters is not equivalent to comparing images, when sharpness parameters are disclosed by Acharya et al. as being values computed from a DWT decomposition of the images. Moreover, the comparison disclosed by Acharya et al. determines a highest sharpness parameter. In contrast, image comparison according to Applicant seeks to find "an image of the typical object that closely ***matches*** the image of the object", as recited in Applicant's Claim 3 (***emphasis*** added). As such, not only do Acharya et al. not disclose image comparison, the Acharya et al. disclosed comparison seeks a ***difference*** and not a ***match*** between that being compared.

In addition, Acharya et al. fail to disclose using either "an image of a typical object", as recited in Applicant's Claims 3 and 24 or "a reference image of a typical object", as recited in Applicant's Claim 28. In particular, as defined by Applicant, the 'typical object' is "an object that is representative of a class of objects" (Applicant's specification, Page 13, line 2). The imaged object is a member of the class of objects but is different from the typical object. As such, the image of a typical object is an image of an object or scene other than that of the imaged object.

Acharya et al. disclose comparing sharpness parameters computed for a series of captured images, each of the images being "of substantially the same scene" (Acharya et al., Col. 4, lines 27-28). Acharya et al. do not and cannot disclose "an image of a

typical object" or "a reference image of a typical object", as defined and employed by Applicant. In fact, Acharya et al. are silent on "a typical object".

Hence, Acharya et al. clearly do not and cannot disclose each element recited in rejected Claims 3, 24 and 28, as originally filed. Therefore, the rejection of Claims 3, 24 and 28 should be withdrawn. Furthermore, Applicant has added the image comparison feature to Claims 1, 21 and 26, as amended herein. Since Acharya et al. at least do not and cannot disclose "a comparison between an image of a typical object and an image of the object", "using image comparison with an image of a typical object", and "image comparison", as recited in amended Claims 1, 21 and 26, respectively, the rejection of Claims 1, 21 and 26 should be withdrawn also.

Hence, Applicant respectfully submits that the examiner has failed to establish *prima facie* anticipation by Acharya et al. of Claims 2, 3, 10, 11, 12, 23, 24, 27 and 28, as originally filed, and Claims 1, 21 and 26, as amended herein. Applicant respectfully requests that the examiner reconsider and withdraw the unsupported rejection under 35 U.S.C. 102(b) with respect to Acharya et al. for at least the reasons set forth hereinabove.

The examiner rejected Claims 1, 4, 5, 6, 7, 8, 9, 21 and 22 under 35 U.S.C. 102(b) as being anticipated by Frost et al., U.S. Patent No. 5,647,025 (hereinafter 'Frost et al.'). Applicant respectfully traverses the rejection on the grounds that a *prima facie* case of anticipation with respect to Frost et al. has not been established. In particular, Applicant submits that Frost et al. fail to disclose, explicitly or implicitly, "each element of the claim under consideration" (*W.L. Gore & Associates v. Garlock*, cited *supra*) and/or fail to disclose the claimed elements "arranged as in the claim" (*Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, cited *supra*) as required by the Federal Circuit for *prima facie* anticipation under 35 U.S.C. 102.

Regarding Claims 5 and 22, the examiner contended, "Frost discloses determining of an initial (first) focus position, which is the best focus position with highest focus (sharpness) score (column 2, lines 26-30; column 5, lines 55-59; column 6, lines 10-20 and lines 53-54; column 9, lines 1-25) and using this initial focus position of an image of the specimen (object) as the first focus position (column 7, lines 12-18)". The examiner further implied that the aforementioned disclosure by Frost et al. is

equivalent to, "using a first focus position corresponding to an image of the object created by the imaging system that has a greatest edge density as an optimum focus position for the imaging system" as recited in Applicant's Claims 5 and 22.

Applicant respectfully disagrees. Frost et al. fail to disclose using edge density to determine an optimum focus position and importantly, are silent on 'edge density' or its use. In fact, Applicant can discern little correlation between that recited in Claims 5 and 22 and that disclosed by Frost et al. and/or contended by the examiner. As such, Applicant is unsure how that contended by the examiner relates to that claimed by Applicant. Applicant respectfully reminds the examiner, "[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability ... If examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent." *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

Frost et al. disclose an apparatus that provides an automatic focusing of biomedical specimens. In particular, Frost et al. disclose, "a morphological image processing automatic focusing apparatus" that "permits a computer to automatically identify objects of interest from a set of images collected from different focal depths, and automatically select the focal depth which corresponds to best focus on the objects of interest" (Frost et al., Col. 1, line 66, through Col. 2, line 5). Frost et al. describe automatically focusing on a slide (i.e., microscope slide) as including "the steps of locating a coverslip, acquiring images from predetermined focal depths in the slide, and starting at an initial focal depth proximate the surface of the coverslip" (Frost et al., Col. 2, lines 20-24). "A set of predetermined characteristics within each of the images are measured to generate at least one image measurement for each of the plurality of images" and "[a] best focus location is determined relative to a focal depth where an acquired image has a highest focus measure", according to Frost et al. (Frost et al., Col. 2, lines 24-30). A 'focus measure', disclosed by Frost et al., is a "gradient focus score", as exemplified by FIG. 6A of Frost et al. It essentially represents a measure of image sharpness or gradient ***intensity*** (i.e., edge ***intensity***). For example, a portion of the gradient focus score associated with vertical gradients is

computed by "subtracting the ***intensity*** value of the pixel immediately below from that of the pixel immediately above" (Frost et al., Col. 7, lines 30-32) (***emphasis*** added).

Furthermore, Frost et al. disclose that "an initial focus position" is found at step 411 at which point "the stage is returned to the center touch location, at such a height that the objective 107 focal plane is just beneath the touched surface of the coverslip 202" (Frost et al., Col. 5, lines 63-65). As such, Frost et al. do not disclose "an initial (first) focus position, which is the best focus position with the highest focus (sharpness) score", as contended by the examiner. In fact, the initial focus position according to Frost et al. is likely a worst focus position with a low or even a lowest focus score. Moreover as discussed hereinabove, the focus measure disclosed by Frost et al. employs an intensity gradient and does not involve a density or number of detected edges. As such, Frost et al. fail to disclose computing or using a "density of edges" or "edge density" in an image of an object to "determine an optimum focus position".

Although not considered by the examiner, Applicant submits that Frost et al. further fail to disclose any of "an image of the typical object" "that closely matches the image of the object" or "a reference image of a typical object", "the typical object representing a class of objects", as is variously recited in Applicant's claims.

Frost et al. disclose that the set of images produced are all of the same object or scene and not of an object being imaged and a separate typical object as claimed by Applicant. Moreover, Frost et al. specifically disclose finding a best focus location "relative to a focal depth where an acquired image has a highest focus measure" (Frost et al., Abstract, lines 10-11). Thus, Frost et al. specifically precludes using "difference between focus positions for a reference image of a typical object and an image of the typical object that closely ***matches*** the image of the object" as recited in Applicant's Claims 5 and 22 (***emphasis*** added). In short, Frost et al. simply do not disclose 'image comparison' that compares a typical object to an object being imaged or matching images to determine focus, as claimed by Applicant.

It is respectfully submitted that Frost et al. are silent on edge density and/or image comparison and the use thereof for automatic focusing. Therefore, Frost et al. simply

do not and can not disclose using edge density and/or image comparison to determine optimum focus position for an imaging system, as claimed by Applicant's in Claims 5 and 22.

Since Claims 1 and 21 have been amended to include one or both of 'edge density' and 'image comparison', then for the reasons set forth above, Frost et al. fail to render unpatentable Applicant's amended Claims 1 and 21. In particular, Frost et al. at least do not disclose "using one or both of an edge density in an image of an object created by the imaging system and a comparison between an image of a typical object and the image of the object ... to determine an optimum focus position", as recited in amended Claim 1. Further, Frost et al. at least do not disclose using "one or both of edge density-based and image comparison-based" determination of an optimum focus, as recited in amended Claim 21. Claim 4 is dependent from Claim 1 and as such, Claim 4 is patentable over Frost et al. for at least the same reasons set for the above.

Hence, Applicant respectfully submits that the examiner has failed to establish *prima facie* anticipation by Frost et al. of Claims 5 and 22 and amended Claims 1, 4 and 21. Claims 6-9 depend from and include all of the limitations of Claim 5. Having failed to establish *prima facie* anticipation of Claim 5 with respect to Frost et al., the examiner has similarly failed to establish a *prima facie* case of anticipation of Claim 6-9 with respect to Frost et al. Applicant respectfully requests that the examiner reconsider and withdraw the unsupported rejection of Claims 1, 4, 5, 6, 7, 8, 9, 21 and 22 under 35 U.S.C. 102(b) with respect to Frost et al. for at least the reasons set forth hereinabove.

The examiner rejected Claim 13 under 35 U.S.C. 103(a) as being unpatentable over Acharya et al. in view of Coates, U.S. Patent No. 4,816,919 (hereinafter 'Coates'). Applicant has canceled Claim 13 herein, without prejudice. Therefore the rejection of Claim 13 is deemed moot.

The examiner rejected Claims 25 and 30 under 35 U.S.C. 103(a) as being unpatentable over Acharya et al. in view of Rooks, U.S. Patent No. 5,719,952 (hereinafter 'Rooks'). The examiner admitted, "Acharya does not teach of the image system being an x-ray laminography system" and contended, "Rooks discloses an

[*sic*] Scanned-Beam X-ray Laminography inspection system ... capable of focusing on a plane of interest to examine features within this plane with great detail and contrast (column 4, lines 11-16)". The examiner further contended, "[o]ne would have been motivated to combine the invention of Acharya with that of Rooks because once the highly focused position for the first object under test has been obtained using Acharya's method, the system will use the first focus position as a reference position to automatically find best focus position for the second object under test at higher speed".

Applicant traverses the rejection on the grounds that the examiner has failed to establish a *prima facie* case of obviousness with respect to Acharya et al. in view of Rooks. Specifically, the examiner failed to show with respect to the rejected claims one or more of 1) "some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings"; 2) "a reasonable expectation of success" in modifying or combining the teachings of the references; and 3) that the prior art references "teach or suggest all the claim limitations", as required by the courts. MPEP, Section 2142, *Establishing a Prima Facie Case of Obviousness*. Moreover, the examiner failed to establish that the teaching or suggestion to make the claimed combination and the reasonable expectation of success are both "found in the prior art, and ***not*** based on applicant's disclosure". *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir.1991) (***emphasis*** added).

Regarding the examiner's contended motivation to combine, MPEP §2143.01 *Suggestion or Motivation to Modify the References* states, "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. 'The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.' *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir.

1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992)". "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)". MPEP §2143.01, cited *supra*. In addition, as stated by the Federal Circuit, to show a motivation to modify/combine requires, "***evidence*** that 'a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed'" (***emphasis*** added). *Ecolochem, Inc. v. Southern Calif. Edison Co.*, 227 F.3d 1361, 1375, 56 USPQ2d 1065, 1075 (Fed. Cir. 2000) (quoting *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1456 (Fed. Cir. 1998)).

Moreover, "Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor." *Para-Ordnance Mfg. v. SGS Importers Int'l*, 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995). In particular, the Federal Circuit held, "[i]t is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious ... '[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to depreciate the claimed invention.'" *In re Fritch*, 972 F. 2d 1260, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992), quoting *In re Fine*, 837 F. 2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988). Additionally, the examiner may not "resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in its factual basis." *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied 389 U.S. 1057 (1998). In short, "[c]ombining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability—the essence of hindsight." *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

With respect to Claims 25 and 30 and a motivation to combine, while perhaps expressing a possible or desirable outcome, the examiner's contended motivation does

not include evidence to meet the standards as set forth by the courts for showing motivation. In particular, Rooks never discloses or suggests automatic focusing, contrary to that contended by the examiner, and Acharya et al. never mention or suggest applying automatic focusing to an X-ray laminography system. Moreover, neither Acharya et al. nor Rooks discloses or suggests using "the first focus position as a reference position to automatically find best focus position for the second object under test at higher speed", as suggested by the examiner. As such, absent the specific teachings of Applicant's disclosure (i.e., without employing impermissible hindsight), one skilled the art would not be motivated to combine Acharya et al. with Rooks, as suggested by the examiner.

Regarding whether the prior art references teach or suggest all the claim limitations, Claim 25 is ultimately dependent from and includes all of the limitations of Applicant's Claim 21 and Claim 30 is ultimately dependent from and includes all of the limitations of Applicant's Claim 26. As discussed above with respect to the rejection of Claims 21 and 26, Acharya et al. fail to disclose that recited in base Claims 21 and 26, as amended herein. Similarly, Rooks fails to disclose that recited in either of amended base Claims 21 and 26. Thus, the teachings of Rooks fail to add to that lacking in the teachings of Acharya et al. which would render amended Claims 21 and 26 unpatentable. As such, Acharya et al. in view of Rooks do not and cannot teach or suggest ***all*** the claim limitations of Claims 25 and 30.

Applicant respectfully submits that the examiner has failed to establish *prima facie* obviousness of Applicant's Claims 25 and 30 with respect to Acharya et al. in view of Rooks for at least the reasons given hereinabove. Reconsideration and withdrawal of the unsupported rejection of Claims 25 and 30 are respectfully requested.

Applicant appreciates the examiner's acknowledgement of the allowability of Claims 15-20. Further, Applicant appreciates the examiner's acknowledgement of the allowability of Claims 14 and 29 if rewritten in independent form including all of the limitations of the base claim and any intervening claim. However, in light of the discussion hereinabove, Applicant respectfully declines to rewrite Claims 14 and 29 at this time and requests reconsideration.

In summary, Claims 1-30 are pending. Claims 1-13, 21-28 and 30 were rejected. Claims 15-20 were allowed and Claims 14 and 29 were objected to. Claims 1, 2, 3, 4, 21, 22, 26 and 27 are amended herein and Claim 13 is canceled, without prejudice. For the reasons detailed above, it is respectfully submitted that Claims 1-12 and 14-30 are in condition for allowance. It is respectfully requested that Claims 1-12, 14 and 21-30 be allowed along with allowed Claims 15-20, and that the application be passed to issue at an early date.

Should the Examiner have any questions regarding the above, the Examiner is urged to contact the undersigned by telephone at the number given below or Robert T. Martin, Attorney for Applicant, Registration No. 32,426 at Agilent Technologies, Inc., telephone number (650) 485-7533.

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